

REMARKS

Paragraph [0095] of the specification was amended to correct a typographical error. Claims 1, 2, 3, 6-8, 10, 11, 14, 15, 17, 19, 20, 22-25, 27, 30-35, 37, 38-43, 47-54 and 62 have been amended without any intention of narrowing the scope of any of the claims. Claims 1-11, 13-55 and 62 are currently pending in the present application. Reconsideration and allowance based on the following remarks are respectfully requested.

Claims 17, 20, 31, 39, and 52 were objected to because of informalities. Applicant traverses these objections for at least the following reasons.

Applicant has amended claims 17, 20, and 52 to recite “enclosure” instead of “volume.” Further, Applicant has amended claims 31 and 39 to correct the typographical errors pointed out by the Office Action.

Accordingly, Applicant respectfully requests the withdrawal of the claim objections.

REJECTIONS UNDER 35 U.S.C. §112

Claims 10, 11, 37 and 38 were rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. Applicant traverses this rejection for at least the following reasons.

The Office Action asserts that the limitation “the gas entering the enclosure at the speed greater than the speed of sound” is not adequately disclosed as to enable one of ordinary skill in the art practice the invention.

In response, Applicant notes that paragraph [0095] of Applicant’s specification provides:

If the radiation attenuator is to be used in an evacuated system, it is desirable for the gas injected through the jets 732 to be confined as much as possible within the attenuator itself. This can be achieved by using a speed of gas ejection from the jets 732 that is larger than the speed of sound, and preferably 10 times the speed of sound. These speeds minimize the divergence of the gas as it flows from jet 732 to orifice 734, and is best achieved with inert gasses like xenon (Xe), nitrogen (N) and argon (Ar).

Applicant submits the speed of sound is a specific velocity that can be readily determined for a particular gas. Further, Applicant submits that one having ordinary skill in the art would have recognized that the velocity of a gas may be controlled, for example, as

disclosed by Applicant using vacuum pumps and/or changing the geometry of the gas jets. *See e.g.*, paragraphs [0094] & [0097] of Applicant's specification.

Accordingly, Applicant submits a *prima facie* case of non-enablement has not been established and respectfully requests the withdrawal of the rejections of claims 10, 11, 37 and 38 under 35 U.S.C. § 112, first paragraph.

REJECTIONS UNDER 35 U.S.C. §102

Claims 26-34, 36, 39, 41, 43, 44, 47, 48, and 52-55 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,545,746 to Nishi ("Nishi"). Applicant traverses this rejection for at least the following reasons.

Applicant submits that the cited portions of Nishi fail to disclose, teach, or suggest a lithographic projection apparatus comprising *inter alia* "a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas, the detector comprising a sensor, the sensor, in operation, providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of gas," as recited in claim 26; or "a radiation-energy sensor proximate to the enclosure, the sensor, in operation, providing an output signal that is proportional to an amount of interaction of the projection beam with the absorbent gas," as recited in claim 52. Similarly, Applicant submits that the cited portions of Nishi fail to disclose, teach, or suggest a device manufacturing method comprising *inter alia* "determining the energy of the radiation by measuring an amount of interaction of the radiation with the absorbent gas, wherein results of the measurement are used to control the energy and/or the duration," as recited in claim 54; or "determining the energy profile of the radiation by measuring an amount of interaction of the radiation with the absorbent gas at a plurality of points, wherein results of the measurement are used to control the energy profile control of the patterned beam," as recited in claim 55.

The cited portions of Nishi make no mention or suggestion of a radiation-energy detector as recited in claims 26 and 52. Yet, the Office Action states "Applicant argues that Nishi includes a pressure sensor, but the purpose here is to continuously control the illumination, and in order to continuously control the illumination, a radiation-energy detector is necessary." (page 10, lines 18-20, of the Office Action). The Office Action, however, provides no basis in fact and/or technical reasoning for this conclusion, as required

by MPEP § 2112¹, other than the conclusionary statement. It is respectfully submitted that the cited portions of Nishi do not inherently disclose a sensor, in operation, providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of absorbent/interactive gas, or measuring an amount of interaction of the radiation with the absorbent gas, as recited in the claims.

Rather, Nishi merely discloses in column 36, lines 1-24, that the pressure of the gas in container 141 is controlled, and the absorptance of the gas is dependent on the pressure of the gas in the container (i.e. if the pressure in container 141 is reduced to close to a vacuum the absorptance increases, and when it is desired to reduce the amount of illuminating light IL, the pressure of the gas in the container 141 is increased). While Nishi may seek to control the illumination, this does not necessarily imply that Nishi must provide a radiation-energy detector as claimed (and indeed, Applicant submits that nowhere does Nishi disclose or suggest this). It is respectfully submitted that it is more likely that Nishi's container 141 includes a pressure sensor than it necessarily includes an undisclosed radiation energy detector. After all, Nishi discloses "enabling the pressure of the gas in the container 141..to be continuously controlled." Col. 36, lines 7-10 of Nishi. Thus, rather than measuring an amount of interaction of the radiation with the absorbent/interactive gas, Nishi more likely measures a pressure of the gas so that the pressure can be adjusted to obtain the desired absorptance level.

Therefore, Applicant respectfully submits that a case of anticipation has not been established and that the cited portions of Nishi fail to disclose, teach, or suggest each and every element recited by claims 26, 52, 54 and 55. Claims 27-34, 36, 39, 41, 43, 44, 47, 48, and 53 respectfully depend from claims 26 and 52 and are, therefore, patentable for at least the same reasons provided above related to claims 26 and 52, and for the additional features recited therein. Thus, Applicant respectfully requests that the rejection of claims 26-34, 36, 39, 41, 43, 44, 47, 48, and 52-55 under 35 U.S.C. §102(e) over Nishi should be withdrawn and the claims be allowed.

¹ "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" MPEP § 2112 (IV) (citations omitted)

Claims 1-5, 7, 13-16, 19, 21, 22, 24, 25, 50, 51 and 62 were rejected under 35 U.S.C. §102(a) as being anticipated by Japanese Application Publication No. JP 2003-257822 to Shiraishi (“Shiraishi”). Applicant traverses this rejection for at least the following reasons.

With respect to independent claims 1, 24, 25, 50, 51 and 62, Applicant notes that this application claims the benefit of at least grand-parent U.S. Patent Application No. 09/866,875, filed May 30, 2001, now U.S. Patent 6,538,716, which relied for priority on European Patent Application Nos. 00304673.7, filed June 1, 2000, and 00304760.2, filed June 6, 2000, certified copies of which, in English, were submitted in the grand-parent application. The Office Action has not identified how or why Shiraishi, which has a publication date of September 12, 2003 that is well after the claimed benefit and priority of the instant application, discloses, teaches or suggests all of the subject matter of claims in the present application, based on their entitled priority dates. Accordingly, a proper rejection has not been made.

Indeed, Applicant submits that the subject matter of these claims are supported by the grand-parent application. For example, see U.S. Patent 6,538,716, Figures 1-2 & 4-7 (showing lithographic projection apparatus having at least one enclosure traversed by beam); col. 8, lines 10-12 (disclosing gases known to absorb radiation, e.g., H₂O and/or hydrocarbons); col. 8, lines 44-60 (determining degree of attenuation substantially determined by measured gas compositions); col. 9, lines 4-7 (disclosing controlling dose by controlling the power of radiation supplied, controlling a variable attenuator or controlling the duration of exposure); col. 9, lines 33-35 (disclosing supplying absorbent gas at appropriate concentration to at least enclosure); & col. 4, lines 53-55 (disclosing non-uniform concentration of absorbent gas to effect beam shaping). Moreover, to the extent one or more of these claims are not supported, Applicant submits that the Office Action has not made a proper showing that the cited portions of Shiraishi disclose all the subject matter of those unsupported claims and indeed, Applicant submits that the cited portions of Shiraishi does not.

Accordingly, Applicant respectfully submits that claims 1, 24, 25, 50, 51 and 62 cannot be anticipated by Shiraishi. Claims 2-5, 7, 13-16, 19, 21 and 22 respectfully depend from claim 1 and are, therefore, patentable for at least the same reasons provided above related to claim 1, and for the features respectively recite therein. Thus, Applicant respectfully requests that the rejection of claims 1-5, 7, 13-16, 19, 21, 22, 24, 25, 50, 51 and 62 under 35 U.S.C. §102(a) over Shiraishi should be withdrawn and the claims be allowed.

Claims 26, 27, 30, 52, 54 and 55 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2001/0030740 to Mori et al. (“Mori”). Applicant traverses this rejection for at least the following reasons.

Applicant submits that the cited portions of Mori fail to disclose, teach, or suggest a lithographic projection apparatus comprising *inter alia* “a radiation-energy detector configured to determine the energy of the beam of radiation, the beam of radiation passing at least partly through a region of interactive gas, the detector comprising a sensor, the sensor, in operation, providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of gas,” as recited in claim 26; or “a radiation-energy sensor proximate to the enclosure, the sensor, in operation, providing an output signal that is proportional to an amount of interaction of the projection beam with the absorbent gas,” as recited in claim 52. Similarly, Applicant submits that the cited portions of Mori fail to disclose, teach, or suggest a device manufacturing method comprising *inter alia* “determining the energy of the radiation by measuring an amount of interaction of the radiation with the absorbent gas, wherein results of the measurement are used to control the energy and/or the duration,” as recited in claim 54; or “determining the energy profile of the radiation by measuring an amount of interaction of the radiation with the absorbent gas at a plurality of points, wherein results of the measurement are used to control the energy profile control of the patterned beam,” as recited in claim 55.

For example, Mori discloses a process for photo-cleaning the optical components in a lithography apparatus. The light detector 24 of Mori alleged by the Office Action to be a sensor for providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of gas, merely detects transmittance of light passing through the projection lens. *See* paragraph [0058] of Mori. The effect on the transmittance due to the gas is only one of many factors that can affect transmittance through the lithographic apparatus. *See e.g.*, paragraph [0012] of Applicant’s specification (disclosing “instability of transmissivity can occur due to, for example, an interaction between projection beam radiation and materials of the optical element of the radiation and projection system.”). However, Mori discloses that the light detector 24 allows “the combined transmittance of the optical components in optical exposure apparatus 5 [to] be immediately determined and compared to an ‘optimum’ transmittance corresponding to the ‘cleanest’ state of the optical exposure apparatus.” Paragraph [0058] of Mori (emphasis added). Thus, the cited portions of

Mori make no mention or suggestion of a sensor, in operation, providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of absorbent/interactive gas, or measuring an amount of interaction of the radiation with the absorbent gas, as recited in the claims. The transmittance measurement by Mori's light detector thus does not measure the amount of interaction of the radiation with the gas since clearly any number of factors (e.g., lens materials, contamination of lenses, temperature of lenses, etc.) along the optical path can affect the Mori's transmittance value and thus that value cannot be a measure of the amount of interaction of the radiation with the gas.

Therefore, Applicant respectfully submits that a case of anticipation has not been established and that the cited portions of Mori fail to disclose, teach, or suggest each and every element recited by claims 26, 52, 54 and 55. Claims 27 and 30 respectfully depend from claim 26 and are, therefore, patentable for at least the same reasons provided above related to claim 26, and for the additional features recited therein. Thus, Applicant respectfully requests that the rejection of claims 26, 27, 30, 52, 54 and 55 under 35 U.S.C. §102(e) over Mori should be withdrawn and the claims be allowed.

REJECTIONS UNDER 35 U.S.C. §103

Claim 35 was rejected under 35 U.S.C. §103(a) as being unpatentable over Nishi in view of U.S. Patent Application Publication No. 2003/0020888 to Tanaka et al. ("Tanaka"). Applicant traverses this rejection for at least the following reasons.

As discussed above, the cited portions of Nishi fail to disclose, teach, or suggest each and every element of claim 26.

Applicant submits the cited portions of Tanaka fail to overcoming the shortcomings of Nishi. For example, Tanaka merely discloses providing pressure sensors for sensing pressure within the spaces between the optical elements and adjusting the optical performance of the optical system based on the pressures detected by the pressure sensor. *See* paragraph [0020] of Tanaka. Thus, the cited portions of Tanaka make no mention or suggestion of a sensor, in operation, providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of gas, as recited in claim 26.

Therefore, Applicant respectfully submits that a *prima facie* case of obviousness has not been established and that the cited portions of Nishi, Tanaka, or a proper combination thereof, fail to disclose, teach, or suggest each and every element recited by claim 26. Claim 35 depends from claim 26 and is, therefore, patentable for at least the same reasons provided

above related to claim 26, and for the additional features recited therein. Thus, Applicant respectfully requests that the rejection of claim 35 under 35 U.S.C. §103(a) over Nishi in view of Tanaka should be withdrawn and the claims be allowed.

Claims 45 and 46 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nishi in view of U.S. Patent No. 6,353,219 to Kley (“Kley”). Applicant traverses this rejection for at least the following reasons.

As discussed above, the cited portions of Nishi fail to disclose, teach, or suggest each and every claim element of claim 26.

Applicant submits the cited portions of Kley fail to overcome the shortcomings of Nishi. Without conceding that Kley is analogous prior art that is properly combinable with Nishi (and indeed, Applicant submits that it is not since a scanning probe microscopy system is nothing at all similar to lithography apparatus and thus, it is not a reference that “logically would have commended itself to an inventor's attention in considering his problem.” *See In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992)), the cited portions of Kley simply fail to disclose, teach, or suggest, a sensor, in operation, providing an output signal that is proportional to an amount of interaction of the beam of radiation with the region of gas, as recited in claim 26.

Therefore, Applicant respectfully submits that a *prima facie* case of obviousness has not been established and that the cited portions of Nishi, Kley, or a proper combination thereof, fail to disclose, teach, or suggest each and every element recited by claim 26. Claims 45 and 46 depend from claim 26 and are, therefore, patentable for at least the same reasons provided above related to claim 26, and for the additional features recited therein. Thus, Applicant respectfully requests that the rejection of claims 45 and 46 under 35 U.S.C. §103(a) over Nishi in view of Kley should be withdrawn and the claims be allowed.

Claims 1-7, 9, 13, 15-19, 21-26, 31-34, 36, 39, 40-43, 47-55 and 62 were rejected under the judicially created doctrine of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, and 5-23 of U.S. Patent No. 6,538,716 (“the ‘716 patent”). Claims 8, 14, 30 and 35 were rejected under the judicially created doctrine of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5, 7 and 19 of the ‘716 patent in view of Tanaka. Applicant traverses these rejections for at least

similar reasons as provided in the Applicant's previous responses, which are incorporated herein in their entirety by reference.

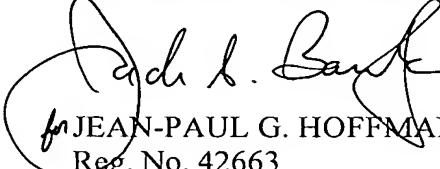
Nevertheless, Applicant would consider filing a terminal disclaimer when the obviousness-type double patenting rejections are the only rejections remaining in the application. Thus, if the present claims are otherwise allowable, but for the obviousness-type double patenting rejections, the Examiner is kindly requested to contact the undersigned regarding filing a terminal disclaimer at that time.

All rejections and objections have been addressed. It is respectfully submitted that the present application is in condition for allowance, and a notice to that effect is earnestly solicited. Should there be any questions or concerns regarding this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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